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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,318

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Jae-Geun Oh

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EXAMINER

WILSON, CHRISTIAN D

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/750,318

Applicant(s)

OH ET AL.

Examiner

Christian Wilson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01272004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search history.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 1 is objected to because of the following informalities: in line 13, "form" is misspelled as "from". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 7 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claims 7 and 16 recite the limitation "the nitride layer". There is insufficient antecedent basis for this limitation in the claim. For the purposes of examination, it will be assumed that claim 7 depends from claim 6 and claim 16 depends from claim 15.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this

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subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 – 4, 6 – 13, and 15 – 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Tran *et al.*

Tran *et al.* (US 6,759,288) discloses a method for forming plugs on active regions of a semiconductor device comprising the steps of forming a plurality of gate lines **16** on a substrate **12**, forming a plurality of cell junctions **202** by ion implanting a first dopant **25** using the gate lines as a mask [column 11, line 10], forming a buffer layer **72**, and forming a plurality of plug regions **212** by ion implanting a second dopant **26** under the buffer layer, and forming a plug **82**.

Regarding claim 2, Tran *et al.* further discloses a blanket implantation for forming the plug region [Figure 22].

Regarding claim 3, Tran *et al.* further discloses a phosphorus implantation with a dose range of  $5 \times 10^{11}$  to  $5 \times 10^{12}$  ions/cm<sup>2</sup> with an energy of 30 – 100 KeV [column 8, lines 1-5].

Regarding claim 4, Tran *et al.* further discloses an energy distribution applied in several sets [Figure 16].

Regarding claims 6 and 7, Tran *et al.* further discloses a nitride layer with a thickness of 30 – 200 Å [column 11, lines 30-45].

Regarding claim 8, Tran *et al.* further discloses N type dopants [column 11, lines 25 and 55].

Regarding claim 9, Tran *et al.* further discloses forming a spacer by etching the buffer layer [Figure 23], forming an interlayer insulation layer **32**, **34**, forming a plurality of contact holes [Figure 23], and forming a plurality of contact plugs **82**.

Regarding claim 10, Tran *et al.* discloses a method for forming plugs on active regions of a semiconductor device comprising the steps of forming a plurality of gate lines **16** on a substrate **12**, forming a plurality of cell junctions **202** by ion implanting a first dopant **25** using the gate lines as a mask [column 11, line 10], forming a buffer layer **72**, and forming a plurality of plug regions **212** by ion implanting a second dopant **26** under the buffer layer.

Regarding claim 11, Tran *et al.* further discloses a blanket implantation for forming the plug region [Figure 22].

Regarding claim 12, Tran *et al.* further discloses a phosphorus implantation with a dose range of  $5 \times 10^{11}$  to  $5 \times 10^{12}$  ions/cm<sup>2</sup> with an energy of 30 – 100 KeV [column 8, lines 1-5].

Regarding claim 13, Tran *et al.* further discloses an energy distribution applied in several sets [Figure 16].

Regarding claims 15 and 16, Tran *et al.* further discloses a nitride layer with a thickness of 30 – 200 Å [column 11, lines 30-45].

Regarding claim 17, Tran *et al.* further discloses N type dopants [column 11, lines 25 and 55].

Regarding claim 18, Tran *et al.* further discloses forming a spacer by etching the buffer layer [Figure 23], forming an interlayer insulation layer **32**, **34**, forming a plurality of contact holes [Figure 23], and forming a plurality of contact plugs **82**.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tran *et al.* in view of Shirahata *et al.*

Tran *et al.* teaches the limitations of claims 1 and 10 as described above including several sets of ion implantations, but Tran *et al.* does not discuss several sets of increasing energy from a high level to a low level. Shirahata *et al.* (US 5,594,264) teaches an ion implantation method where several sets of dopants are implanted with increasing energy from a high level to a low level [Figure 28]. It would have been obvious to one of ordinary skill in the art to use the implantation method of Shirahata *et al.* in the method of Tran *et al.* since this method provides prevents punch through and improves the threshold voltage of the resulting device.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited prior art teaches methods of implanting through a buffer layer.

10. A copy of the EAST search history is enclosed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886.

The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'CW', with a stylized flourish at the end.

Christian Wilson, Ph.D.  
Primary Examiner  
Art Unit 2891

CDW